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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,396	02/09/2004	Hiroaki Sudo	P24788	6607

7055 7590 08/01/2007

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EXAMINER	
SAWHNEY, VAIBHAV	
ART UNIT	PAPER NUMBER
2616	

NOTIFICATION DATE	DELIVERY MODE
08/01/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/773,396	SUDO ET AL.	
	Examiner	Art Unit	
	VAIBHAV (MANU) SAWHNEY	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :05/12/2004, 06/30/2004, 05/09/2007 .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-2, 4-9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maddocks et al. (GB 2291314) in view of Larsson et al. (WO 97/30531).

As to claim 1, Maddocks et al. show a method of setting a guard interval (Page 6, lines 7-9; lines Page 25, lines 3-10; Fig. 3 shows short guard interval and long guard interval) in an OFDM communication (Page 1, line 3) comprising first valid symbol (Fig. 5, Ai is the first symbol) and second valid symbol (Fig. 5, Bi is the second valid symbol) as well as guard intervals attached to them (Fig. 3, shaded grey areas are guard intervals attached to each symbol); and providing the guard interval (Fig. 3, shaded region) of the second valid symbol at a length greater (Fig. 3, last symbol in the figure is interpreted as the second symbol with the long/longer guard interval) than the guard interval of the first valid symbol (Fig. 3, "symbol for fixed reception", short/shorter guard interval/shaded region).

However, Maddocks et al. do not show a method of attaching a part of a first valid symbol to the first valid symbol as a guard interval, and attaching a part of a second valid symbol requiring higher channel quality than the first valid symbol, to the second valid symbol as a guard interval.

Larsson et al. show a method of attaching a part of a first valid symbol to the first valid symbol as a guard interval (Page 3, lines 25-26 shows "a portion/part of a symbol burst/symbol is repeated/attached within said symbol burst as a guard space/guard interval); attaching a part of a second valid symbol requiring higher channel quality (Page 5, lines 2-12 shows receiver calculates the signal/channel quality of the received symbols and sends back signal to the transmitter to adjust the guard interval/space to increase the signal/channel quality to prevent data loss) than the first valid symbol, to the second valid symbol as a guard interval (Page 3, lines 25-26 shows "a portion/part of a symbol burst/symbol is repeated/attached within said symbol burst as a guard space/guard interval). Therefore, it would have been obvious to one of ordinary skilled in the art to modify the method of Maddocks et al. at the time of the invention to use variable sized guard intervals, rather than fixed guard intervals to avoid unnecessary overhead and conserve network resources.

As to claim 2, Maddocks et al. show a method of maintaining the length of the first valid symbol and the second valid symbol (Fig. 4 shows 4 mini-symbols of equal length/250 microseconds, comprising first valid symbol and second valid symbol; Fig. 5

shows 4 of these mini-symbols/symbols comprising the first valid symbol Ai and second valid symbol Bi and so on of equal length; Page 7, lines 1-2; lines 35-37).

As to claim 4, Maddocks et al. show all the elements except a method of changing the length of the guard interval of the first valid symbol in accordance with channel quality.

Larsson et al. show a method of changing the length of the guard interval of the first valid symbol in accordance with channel quality (Page 5, lines 2-12 shows receiver calculating the signal/channel quality of the received symbols and sends back signal to the transmitter to adjust/change the guard interval/space/guard length in response to the received signal/channel quality to prevent data loss). Therefore, it would have been obvious to one of ordinary skilled in the art to modify the method of Maddocks et al. at the time of the invention to provide efficient communication and avoid data loss by adjusting/changing guard intervals.

As to claim 5, Maddocks et al. show all the elements except a method of maintaining the length of the guard interval of the second valid symbol.

Larsson et al. show a method of maintaining the length of the guard interval of the second valid symbol (Page 2, line 16 shows the use of fixed/maintaining guard interval/space being used). Therefore, it would have been obvious to one of ordinary skilled in the art to modify the method of Maddocks et al. at the time of the invention to prevent/avoid mutual interference between adjacent symbols.

As to claim 6, Maddocks et al. show a method of maintaining the length of the guard interval of the second valid symbol at a predetermined length greater (Fig. 3, last symbol in the figure is interpreted as the second symbol with the long/longer guard interval) than the guard interval of the first valid symbol (Fig. 3, "symbol for fixed reception", short/shorter guard interval/shaded region).

As to claim 7, Maddocks et al. show all the elements except a method of forming the guard interval of the second valid symbol by attaching a length that changes in accordance with channel quality of the guard interval of the first valid symbol.

Larsson et al. show a method of forming the guard interval of the second valid symbol by attaching a length that changes in accordance with channel quality of the guard interval of the first valid symbol (Page 5, lines 2-12 shows receiver calculating the signal/channel quality of the received symbols and sends back signal to the transmitter to adjust/change the guard interval/space/guard length of the subsequent/second symbol in response to the received signal/channel quality to prevent data loss). Therefore, it would have been obvious to one of ordinary skilled in the art to modify the method of Maddocks et al. at the time of the invention to provide efficient communication and avoid data loss by adjusting/changing guard intervals.

As to claim 8, Maddocks et al. show a method of setting a guard interval (Page 6, lines 7-9; lines Page 25, lines 3-10; Fig. 3 shows short guard interval and long guard

interval) in an OFDM communication (Page 1, line 3) comprising first valid symbol (Fig. 5, Ai is the first symbol) and second valid symbol (Fig. 5, Bi is the second valid symbol) as well as guard intervals attached to them (Fig. 3, shaded grey areas are guard intervals attached to each symbol); and maintaining the length of the first valid symbol (Fig. 4 shows 4 mini-symbols/symbols of equal length/250 microseconds, comprising first valid symbol and the second valid symbol; Fig. 5 shows 4 of these mini-symbols/symbols comprising the first valid symbol Ai and second valid symbol Bi and so on of equal length; Page 7, lines 1-2; lines 35-37).

However, Maddocks et al. do not show a method of attaching a part of the first valid symbol to the first valid symbol as a guard interval; attaching a part of a second valid symbol requiring higher channel quality than the first valid symbol, to the second valid symbol as a guard interval; and changing the length of the guard interval of the first valid symbol in accordance with channel quality.

Larsson et al. show a method of attaching a part of a first valid symbol to the first valid symbol as a guard interval (Page 3, lines 25-26 shows "a portion/part of a symbol burst/symbol is repeated/attached within said symbol burst as a guard space/guard interval); attaching a part of a second valid symbol requiring higher channel quality (Page 5, lines 2-12 shows receiver calculates the signal/channel quality of the received symbols and sends back signal to the transmitter to adjust the guard interval/space to increase the signal/channel quality to prevent data loss) than the first valid symbol, to

the second valid symbol as a guard interval (Page 3, lines 25-26 shows "a portion/part of a symbol burst/symbol is repeated/attached within said symbol burst as a guard space/guard interval).

Larsson et al. further show a method of changing the length of the guard interval of the first valid symbol in accordance with channel quality (Page 5, lines 2-12 shows receiver calculating the signal/channel quality of the received symbols and sends back signal to the transmitter to adjust/change the guard interval/space/guard length in response to the received signal/channel quality to prevent data loss). Therefore, it would have been obvious to one of ordinary skilled in the art to modify the method of Maddocks et al. at the time of the invention to provide efficient communication and avoid data loss by adjusting/changing guard intervals.

As to claim 9, Maddocks et al. show a method of providing the guard interval (Fig. 3, shaded region) at a greater length (Fig. 3, last symbol in the figure is interpreted as the second symbol with the long/longer guard interval; Fig. 3, "symbol for fixed reception", short/shorter guard interval/shaded region).

However, Maddocks et al. do not show a method of attaching a part of a valid symbol to the valid symbol as a guard interval; and adjusting the guard interval length/greater when the valid symbol requires higher quality.

Larsson et al. show a method of attaching a part of a valid symbol to the valid symbol as a guard interval (Page 3, lines 25-26 shows "a portion/part of a symbol

burst/symbol is repeated/attached within said symbol burst as a guard space/guard interval); and providing the guard interval at an adjusted/greater length when the valid symbol requires higher quality (Page 5, lines 2-12 shows receiver calculating the signal/channel quality of the received symbols and sends back signal to the transmitter to adjust/change the guard interval/space/guard length of the subsequent/second symbol in response to the received signal/channel quality to prevent data loss). Therefore, it would have been obvious to one of ordinary skilled in the art to modify the method of Maddocks et al. at the time of the invention to provide efficient communication and avoid data loss by adjusting/changing guard intervals.

As to claim 11, Maddocks et al. show an apparatus (Fig. 9, 10, and 11) comprising a provider configured to provide the guard interval (Fig. 3, shaded region) of the second valid symbol at a length greater (Fig. 3, last symbol in the figure is interpreted as the second symbol with the long/longer guard interval) than the guard interval of the first valid symbol (Fig. 3, "symbol for fixed reception", short/shorter guard interval/shaded region).

However, Maddocks et al. do not show an attacher configured to attach a part of a first valid symbol to the first valid symbol as a guard interval (Page 3, lines 25-26 shows "a portion/part of a symbol burst/symbol is repeated/attached within said symbol burst as a guard space/guard interval), and further configured to attach a part of a second valid symbol requiring higher channel quality than the first valid symbol as a guard interval (Page 3, lines 25-26 shows "a portion/part of a symbol burst/symbol is

repeated/attached within said symbol burst as a guard space/guard interval; Page 5, lines 2-12 shows receiver calculating the signal/channel quality of the received symbols and sends back signal to the transmitter to adjust/change the guard interval/space/guard length of the subsequent/second symbol in response to the received signal/channel quality to prevent data loss). Therefore, it would have been obvious to one of ordinary skilled in the art to modify the method of Maddocks et al. at the time of the invention to provide efficient communication and avoid data loss by adjusting/changing guard intervals.

3. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maddocks et al. (GB 2291314) in view of Larsson et al. (WO 97/30531), further in view of Weck (6,115,354).

As to claim 3, Maddocks et al. and Larsson et al. show all the elements except a method of inserting user data in the first valid symbol; and inserting control data in the second valid symbol.

Weck shows a method of inserting user data in the first valid symbol (Fig. 1, "active OFDM symbol" having data inside it/inserted); and inserting control data in the second valid symbol (Fig. 1, "OFDM SYMBOLS" having control data inserted inside them). Therefore, it would have been obvious to one of ordinary skilled in the art to modify the method of Maddocks et al. to and Larsson et al. to add control data in

symbols at the time of the invention to avoid a reduction of the useful signal capacity as suggested by Weck.

As to claim 10, Maddocks et al. show a method of providing the guard interval (Fig. 3, shaded region) of the second valid symbol at a length greater (Fig. 3, last symbol in the figure is interpreted as the second symbol with the long/longer guard interval) than the guard interval of the first valid symbol (Fig. 3, "symbol for fixed reception", short/shorter guard interval/shaded region).

However, Maddocks et al. do not show a method of attaching a part of a valid symbol to the valid symbol as a guard interval; and a valid symbol including control data and user data.

Larsson et al. show a method of attaching a part of a valid symbol to the valid symbol as a guard interval (Page 3, lines 25-26 shows "a portion/part of a symbol burst/symbol is repeated/attached within said symbol burst as a guard space/guard interval). Therefore, it would have been obvious to one of ordinary skilled in the art to modify the method of Maddocks et al. at the time of the invention to provide efficient communication and avoid data loss by adjusting/changing guard intervals.

Weck shows a method of including control data and user data in the valid symbol (Fig. 1, "active OFDM symbol" having user data included in it; Fig. 1, "OFDM SYMBOLS" having control data included in them). Therefore, it would have been

obvious to one of ordinary skilled in the art to modify the method of Maddocks et al. and Larsson et al. to add control data in symbols at the time of the invention to avoid a reduction of the useful signal capacity as suggested by Weck.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Any inquiry concerning this communication or earlier communications from the examiner should be directed to VAIBHAV (MANU) SAWHNEY whose telephone number is 571-272-9738. The examiner can normally be reached on Monday - Friday 1000 - 1930 EST, altern. fri. off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, KWANG B. YAO can be reached on 571-272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Vaibhav A

VAIBHAV (MANU) SAWHNEY

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SUPERVISORY PATENT EXAMINER